

ALS9A250

DEPTH BACKUP AND DRUM ROTATION DISPLAY PANEL

Operations and Maintenance Manual



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1.0 GENERAL DESCRIPTION





Note position of the six batteries.

USE ONLY 1.2V NIMH AA 2100MAH BATTERIES

WARNING

**DO NOT USE NON RECHARGEABLE
BATTERIES AS THEY ARE LIKELY TO
EXPLODE WHEN CHARGED**

The Backup Depth and Drum Rotation Counter System is designed to be an independent depth measurement indicator for mounting inside a wireline unit. The depth is measured by a magnetic pickup mounted in the measuring head and displayed in either feet or meters at the display unit.

The Drum rotation is measured by a magnetic pickup mounted near the drum where it can count the ribs in the drum. It also may be installed on the slip ring attached to the reel. The unit is powered by six internal batteries. It can be connected to an external AC or DC power source to keep the batteries charged. Depth, Line Speed and Tension are sent via a CAN BUS to the Rexroth controller.

The unit is designed to be configured at the beginning of the operation and then operate without intervention from the user. When external power fails, the depth display is maintained by the batteries. If the magnetic pickup is inactive for more than one hour, the depth is stored and the unit switches itself off.

It can be connected to two different reels. The reel that is being operated is selectable in the menu.

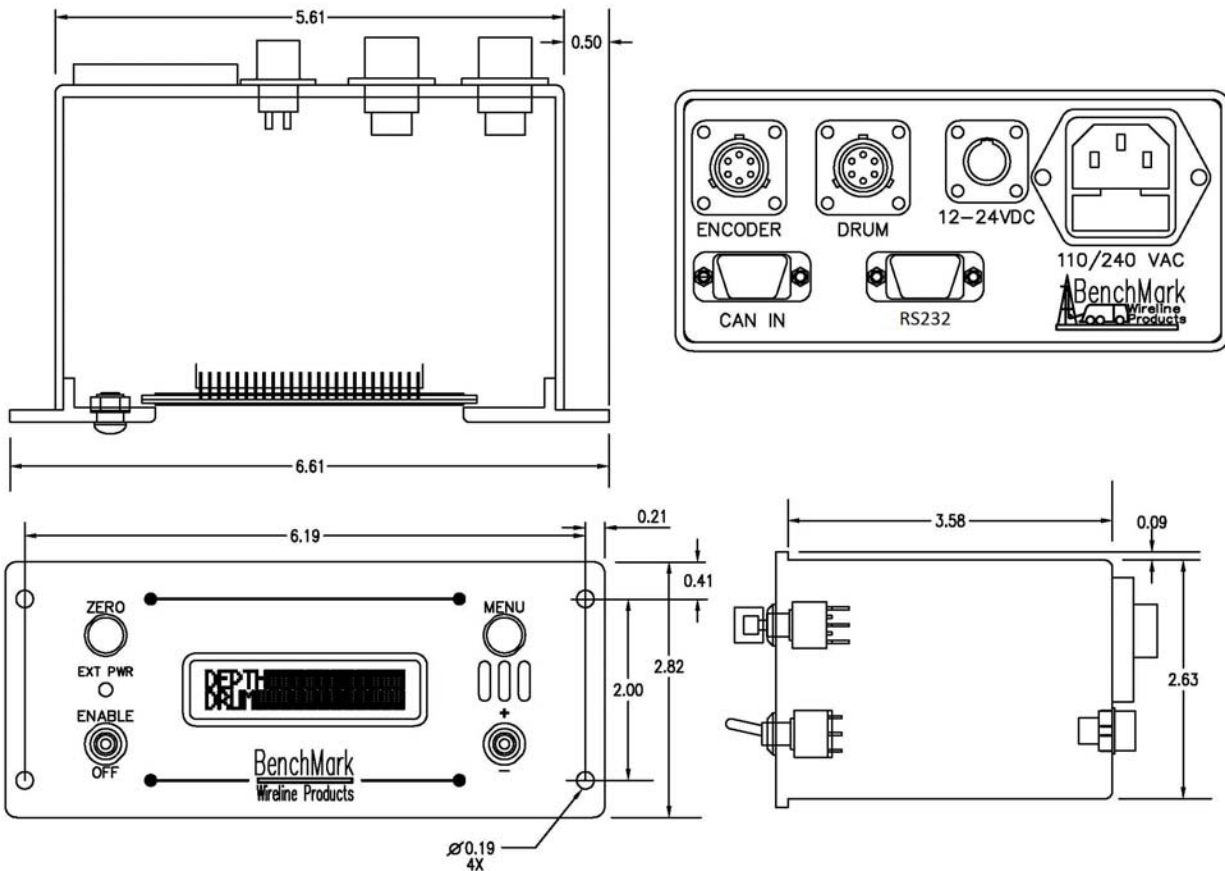
Front panel controls allow the operator to:

- Zero the depth and rib counter reading
- Adjust the depth value
- Select a different settings using the menu button
- Switch the power off manually (for use only when running on battery power)

The unit is switched on automatically, when external power is restored, or when the user selects the enable switch on the front panel

2.0 SPECIFICATIONS

2.1.0 Mechanical



Material	Aluminium, anodized
Weight	1.5 lbs (.68 kg)
Mounting	4 × .019 holes fixing centers: 6.19" (19.05 cm) from side, 2" (5.08 cm) from top/bottom.

2.1.1 Environmental

IP Rating	40
Temperature	0 to + 50 ° Centigrade
Humidity	10% - 80% RH non-condensing.

2.1.2 Electrical

Input power Voltage	100 - 240 VAC or 12 – 24 VDC
Input power frequency	50 - 60 Hz, DC
Input power current	0.4 A

2.1.3 Batteries

Battery	2100 mAh
Voltage	1.2 V NIMH
Lifetime	Approx. 5 years (depending on usage)

The batteries are trickle charged when external power is connected to the unit. The batteries are fully charged after 4 hours. The batteries discharge if the unit is left unpowered for a few weeks.

2.1.4 Power consumption and operating time

Operating	50 - 60 mA (typical with sensors)
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2.1.5 AC Power Input

Line	Brown	White
Neutral	Blue	Black
Earth	Green/Yellow	Green

Power is fused inside the display unit case with a 250 mA fuse

2.1.6 DC Power-input

12-24vdc	Pin A
12vdc GND	Pin B

DC connector spec: AM5KP063 -CONN KPT06E8-33S 3 SOCKET

2.1.7 Depth Measurement

Quadrature counts/revolution	16	
Measurement resolution	0.048 m	0.1573 ft
Display resolution	0.1 m	0.1 ft

2.1.8 Drum Rib Counter Measurement

Quadrature counts/revolution	Number of ribs
Measurement resolution	360/number of ribs
Display resolution	0.01 ribs

2.1.9 Line Speed

Minimum Line Speed	0 ft/min
Maximum Line Speed	1200 ft/min

2.2.0 Power management

Power time-out with idle magnetic pickup	60 min
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The battery voltage and charge current can be displayed by pressing enable and menu at the same time.

The voltage will be displayed as:

E 4180

4180 would be a battery voltage of 4.18 volts. When the battery reaches 4.8v the charge will stop.

The charge current will be displayed as:

A 310

310 would be a battery charge current of 310 ma.

The display will cycle between the voltage and current display as long as the buttons are being depressed.

The charge current is limited to between 250 ma and 350 ma.

3.0 OPERATING PROCEDURES

- 3.1 If external power is applied, the unit will power on and charge the batteries. Turn the unit's display on by pressing the enable switch up.
 - 3.1.1 Select the appropriate settings from the menu for measuring depth and the ribs of the drum (see section 4.0)
 - 3.1.2 Set the depth to the proper value by using the +/- switch or set it to 0 by pressing the zero switch. Note: the enable switch needs to be pressed in order to set depth.
 - 3.1.3 Set the number of ribs in the reel using the menu and the +/- switch.
 - 3.1.4 The system is now ready to measure depth and count the ribs of the drum.
 - 3.1.5 After each run in the hole, reset the zero value before entering the hole again.

Setup Instructions When Using the a Slip Ring with integral encoder

- 3.1.6 Turn the unit on by pressing the enable switch up. If external power is applied, the unit will power on automatically.
- 3.1.7 Set the depth to the proper value by using the +/- switch or set it to 0 by pressing the zero switch. Note: the enable switch needs to be pressed in order to set depth.
- 3.1.8 When entering the parameters for the panel, set the number of ribs to 100 using the menu and the +/- switch. The encoder in the slip ring is 100 ppr (100 pulses per revolution).
- 3.1.9 When Using the Benchmark FSU4A250 Reel Thru Shaft Encoder, set the number of ribs to 6.
- 3.2.0 The system is now ready to measure depth and count the revolutions of the drum using the encoder mounted on the Slip Ring.
- 3.2.1 After each run in the hole, reset the zero value before entering the hole again.

3.2.2 Typical Cable Pin Out for Slip Ring mounted encoder

<u>Pin</u>			<u>Pin</u>		<u>Signal</u>
A	to		D		Encoder Phase B
C	to		A		+5vdc
D	to		B		GND
E	to		C		Encoder Phase A

Cable Pin Out for BenchMark FSU4A250 thru Shaft Encoder:

<u>Pin</u>			<u>Pin</u>		<u>Signal</u>
A	to		A		Encoder Phase B
C	to		C		+5vdc
D	to		D		GND
E	to		E		Encoder Phase A

4.0 DESCRIPTION OF FEATURES

4.1.0 Enable Switch

The ENABLE/OFF switch is a center-biased three position switch. If you push the switch down, the magnetic pickup stores the displayed value in the non-volatile memory and switches the unit off if not on external power. *When connected to external power, the unit's display can be turned off but the batteries continue to charge.*

The display unit forces you to use two switches to prevent accidental loss or corruption of the depth display value.

The up position (ENABLE) does several things:

The unit powers on, and the unit re-displays the stored value.

Enable is also required to zero or increase/decrease the depth.

4.1.1 Menu Switch

This button is used to change the internal settings of the panel. These settings include Measuring Head type, Line Size settings, Load Cell Angles, English/Metric units, Depth adjust (auto add/subtract), etc. Refer to section 4 for detailed description of these features.

4.1.2 Zero Switch

The ZERO switch allows you to zero the depth and drum rotation displays. It is a two position momentary switch. To activate this switch, you must hold the ENABLE switch up, then press this switch up. The rate of increase (or decrease) is controlled by the length of time the INCREASE/DECREASE switch is held in position. For small adjustments, hold the ENABLE switch up and jog the INCREASE/DECREASE switch.

4.1.3 Increase / Decrease (+/-) Switch

The INCREASE/DECREASE switch is a center biased three position switch. Hold increase/decrease switch up and the display value increases. Hold the increase/decrease switch down and the display value decreases.

4.1.4 EXT PWR LED

There is one LED on the front panel of the display unit. The LED is lit when the unit is connected to an external power source, either 240/120 vac or 12 vdc. If the LED is not lit, then the unit is operating on battery power.

4.1.5 **ALARM**

The alarm will sound when the drum exceeds five revolutions, then when the revolutions decrease to less than five. To silence the alarm, press the zero button for 5 seconds.

4.1.6 **BATTERY VOLTAGE AND CURRENT MONITOR**

The battery voltage is displayed in the lower right hand corner. Battery current is usually 50 to 60ma with a backup and rib counter sensor installed. When the batteries are being charged, the current is typically less than 200ma.

4.1.7 **ERRORS**

If errors occur in the panel causing it to reset, the alarm will sound and error messages will be displayed. Some sample error messages are below:

Error SPI
Error CAN
Error TIMER

To continue using the panel, press the zero button.

5.0 MENU SELECTIONS

The internal settings of the panel can be set by pressing the menu button.

To change a setting, press and release the menu button until the desired setting is displayed. Use the +/- switch to change the setting. After a setting is changed, continue pressing the menu button until you pass the last setting. At this time you will be asked if you want to ACCEPT the setting changes. To accept the changes press + then the MENU button. If you press – or wait for four seconds, the changes will be ignored. If you wait for four seconds between switch presses, the panel will time out and go back to displaying depth.

There are four different menus, one for each of the different type of measuring systems.

- AMS3K** – Benchmark AM3K Cased Hole Measuring head
- AMS5K** – Benchmark AM5K Open Hole / Cased Hole Measuring head
- AMSHARK** – Benchmark dual 16” Wheel Slickline Measuring head
- AMSMAKO** - Benchmark dual 4’ Wheel Slickline Measuring head
- MEGAMOUTH** - Benchmark dual 4’ Wheel Slickline Measuring head
- OTH** – Other wheel size

To change the head type, press the menu button until head is displayed. At this time press the +/- button until the desired head type is selected. Press + then the menu button again to accept the setting.

Each head type has a different menu. Following are the available settings for each.

5.1.0 AM3K MODE

This mode is for a BenchMark AM3K cased hole measuring head.

The available menu selections in AM3K mode are:

LINE SIZE SETTINGS (LS)

Select the size of the cable you will be using. This setting will adjust the wheel size to account for the size of cable.

The available Line and Wheel sizes are:

3/16" cable – 2.014 ft.
7/32" cable - 2.017 ft.
1/4" cable – 2.020 ft.
9/32" cable – 2.023 ft.
5/16" cable - 2.026 ft.
.348" cable – 2.027 ft.
.359" cable – 2.028 ft.
3/8" cable – 2.031 ft.

DEPTH ADJUST (Adj)

This setting is comparable to shimming a wheel. The amount selected will automatically be added or subtracted from the depth input. The values are feet / thousand.

DEPTH UNITS (UN)

This setting is used to set the display readout units to either FEET or METERS.

DIRECTION (dir)

This setting is used to reverse the counting direction. The depth should be increasing as you are going into the hole and decreasing as you are coming out of the hole. If it is going the opposite direction, use this setting to change it.

5.1.1 **AM5K MODE**

No wheel size selections are available. It is set for 2'. Use the setting for any straight-line measuring device that uses a 2 foot measuring wheel.

The available menu selections in AM5K mode are:

DEPTH ADJUST (Adj)

This setting is comparable to shimming a wheel. The amount selected will automatically be added or subtracted from the depth input. The values are feet / thousand.

DEPTH UNITS (UN)

This setting is used to set the display readout units to either FEET or METERS.

DIRECTION (dir)

This setting is used to reverse the counting direction. The depth should be increasing as you are going into the hole and decreasing as you are coming out of the hole. If it is going the opposite direction, use this setting to change it.

5.1.2 SHARK, MEGAMOUTH, MAKO MODE

These modes are used for a Benchmark SHARK slickline system using a 4' counter wheel.

The available menu selections in the AMSSHARK mode are:

LINE SIZE SETTINGS (LS)

Select the size of the cable you will be using. This setting will adjust the wheel size to account for this size of cable.

The available sizes are:

.092"
.108"
.125" (1/8")
.140"
.150"
.160"
.187" (3/16")
.218" (7/32")
.250" (1/4")
.312" (5/16")

DEPTH ADJUST (Adj)

This setting is comparable to shimming a wheel. The amount selected will automatically be added or subtracted from the depth input. The values are feet / thousand.

DEPTH UNITS (UN)

This setting is used to set the display readout units to either FEET or METERS.

DIRECTION (dir)

This setting is used to reverse the counting direction. The depth should be increasing as you are going into the hole and decreasing as you are coming out of the hole. If it is going the opposite direction, use this setting to change it.

5.1.3 OTHER

This menu is to be used if you have a measuring device with a different wheel circumference than the standard BenchMark measuring devices.

No line size selections are available

The available menu selections in the OTHER menu are:

WHEEL CIRCUMFERENCE (Cr)

This setting represents the circumference of the measuring wheel. Use the +/- switch to adjust the setting to match the circumference of the measuring wheel you are using.

DEPTH ADJUST (Adj)

This setting is comparable to shimming a wheel. The amount selected will automatically be added or subtracted from the depth input. The values are feet / thousand.

DEPTH UNITS (UN)

This setting is used to set the display readout units to either FEET or METERS.

DIRECTION (dir)

This setting is used to reverse the counting direction. The depth should be increasing as you are going into the hole and decreasing as you are coming out of the hole. If it is going the opposite direction, use this setting to change it.

5.1.4 NUMBER OF DRUM SENSOR RESOLUTION

Enter the number of the ribs in the drum thru the menu setup.

As the drum moves the magnetic pickup mounted next to the drum counts the ribs.

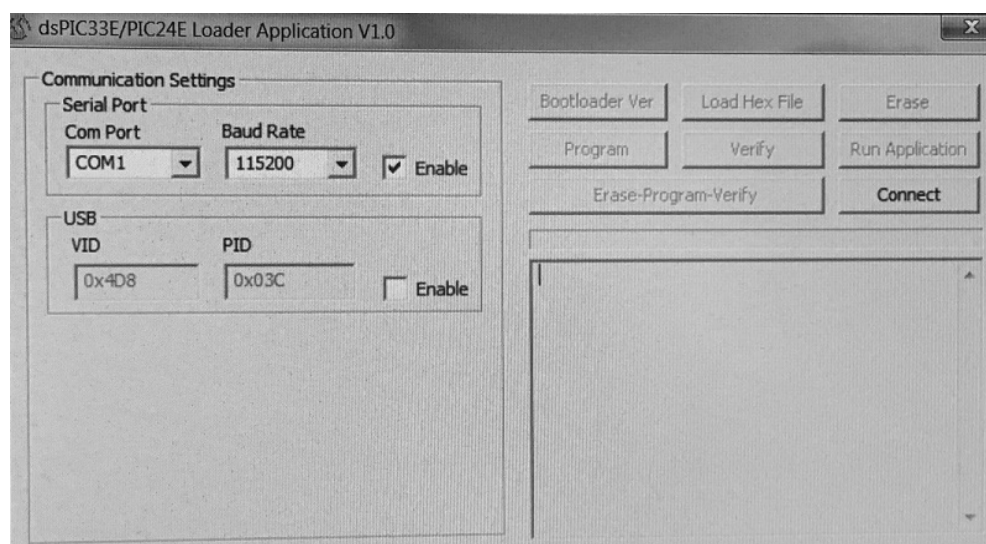
The Rib Counter alarm will sound when the drum exceeds 5 revolutions and then when the revolutions decrease less than 5. The alarm can be silenced by pressing the zero button for 5 seconds.

To zero the depth and drum counter revolutions, press the enable and zero buttons simultaneously.

6.0 PROGRAMMING INSTRUCTIONS

- 6.1.0 Contact BenchMark at mail@benchmarkwireline.com or go the BenchMark website at www.benchmarkwireline.com for the latest version of software.
- 6.1.1 Download the PC loader program from the internet at www.????? to a computer.
- 6.1.2 Connect a serial cable from the 9 pin RS232 connector on the rear panel to a serial connector on a computer. If your computer does not have a serial connector, then use a USB to serial to converter cable and connect to a USB port on the computer.

Double click on the PC loader program.



Turn on power to the ALS9A250 panel while holding the +/- switch down. The beeper sound will come on.

Press the 'Connect' button. If it does not connect, you will have to select the correct 'Com Port' by pressing the down arrow.

Press the 'Load Hex File' and browse to the location of the latest software on the computer.

Then press the 'Erase-Program-Verify' button. The new software will be programmed into the panel.

After it is finished, press 'Run Application' button. This completes the programming procedure. Exit the program.

7.0 INSTALLATION AND MOUNTING

7.1.0 INSTALLATION PROCEDURE

Prepare an appropriate panel cut-out with four fixing holes (refer to drawing in section 6.1) or use one of the two mounting brackets shown below (section 5.2).

Connect the depth backup magnetic pickup and rib counter sensor cables to the rear of the unit.

Ensure that power is off. Connect the unit to a 12vdc or 120/240 vac power supply.

Insert the unit into the panel cut-out and secure it at the four corners.

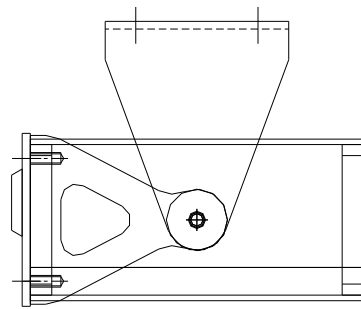
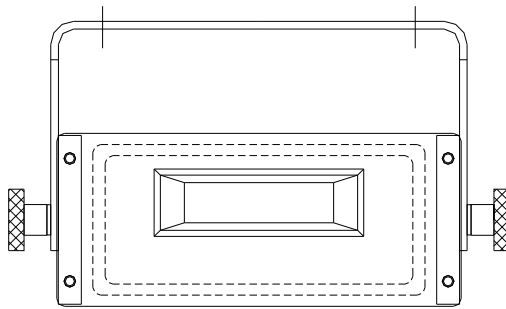
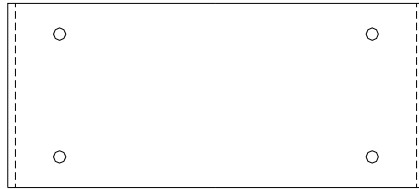
Check that the magnetic pickup signal has the correct polarity. Move the measuring wheel in the direction of positive depth (down). If the display shows a negative value, it can be corrected by rotating the magnetic pickup on the measuring head by 180 degrees or changing the direction using from the menu. Set up the rib counter in the same manner.

Ensure that the unit is setup for the desired measurement units (feet or meters).

Before you start to use the display unit, leave it connected to the external power for 4 hours to ensure that the batteries are fully charged.

7.1.1 MOUNTING KITS

AMS4A161 PIVOTING MOUNT

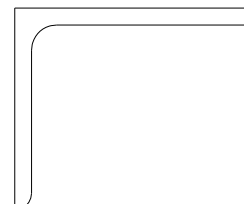


AMS4M110 PLATE MOUNT

TOP VIEW



FRONT VIEW



SIDE VIEW

7.1.2 BOLT ON RIB COUNTER SENSOR FOR DRUMS A SLIP RINGS

The Drum Rib counter sensor below can be bolted onto Slickline drums that do not need a slip ring. Enter 4 for the number of ribs when using this sensor.



8.0 PARTS LISTS AND DIAGRAMS

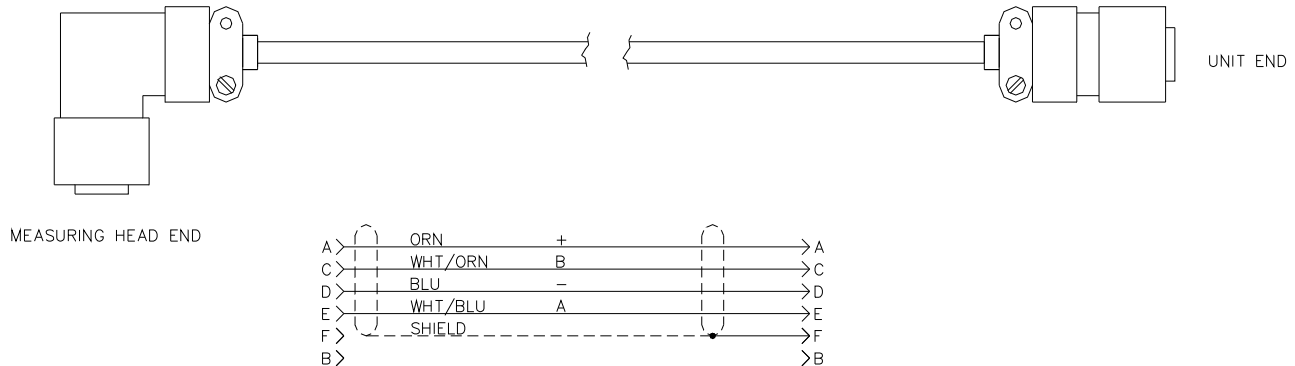
8.1.0 PARTS LISTS

ALS9A250 PANEL DEPTH DRUM RIB CNTR DSP BATT

Component	Description	Qty Required	UM
ALS9M201	PANEL FRONT DRUM CNTR PNL MT	1	EA
ALS9M202-50	PANEL REAR DRUM COUNTER PNL MT	1	EA
AMS5P188	SPACER ROUND NYLON #4 X 1/8	4	EA
ALS6M004	CHASSIS BACKUP DISPLAY PNL TOP	1	EA
ALS6M005	CHASSIS BACKUP DISPLAY PNL BTM	1	EA
AMS4P263	CONN KPSE02E10-6P RECEPTACLE	1	EA
AMS4P257	CONN KPT02E8-33P RECEPTACLE	1	EA
AMS4P164	CONN DB9S CRIMP AMP USED WITH	1	EA
ALS4P063	DISPLAY 2X16 NHD-0216B3Z-FL-GB	0	EA
ALS8P057	INSERT CLINCH NUT 6-32	2	EA
AMS4P264	CONN KPSE02E10-6S RECEPTACLE	1	EA
AMS4P621	POWER SUPPLY 12V 7W 85-264ACIN	1	EA
C276P155	CABLE BELDEN 177431 10' AC	1	EA
AMS4P276	RECEPTACLE 115/240 VAC FUSED	1	EA
AMS4P786	FUSE 0.5A 250V 5X20MM GLASS	2	EA
AMS4P618	BATTERY 1.2V NIMH AA 2100MAH	6	EA
AMS4P021	SWITCH CAP ALCO C-22 BLACK	1	EA
AMS7P017	SWITCH CAP ALCO C-22 RED	1	EA
AMS4P631	NUT 1/4-40 DRESS BRIGHT NICKEL	4	EA
AMS4P659	CONN TERMINAL RECPTACLE .25TAB	3	EA
AMS7P021	CONN 102398-4 AMP 12 POS PCB	1	EA
AMS7P023	CONN 102536-4 AMP 12 POS BACK	1	EA
AMS7P024	CONN 102681-1 AMP 12 POS FRONT	1	EA
AMS4P661	CONN HOUSING 3POS 2.5MM SHROUD	1	EA
AMS4P662	CONN FE TERMINAL CRIMP 2.5MM	4	EA
AMS4P663	CONN HOUSING 2POS 2.5MM SHROUD	1	EA
ALS8P041	HOLDER BATT 6AA W 9V SNAP CON	1	EA
ALS8M057	TRAY BATTERY 6XAA BK TENSN	1	EA
ALS8M037	CLAMP BATTERY 6XAA BKUP TENSN	1	EA
ALS8P042	SPACER ROUND PHENLC #6 X 1-1/2	2	EA
C276P046	WASHER #6 LOCK SS	2	EA
ALS8P043	SCREW 6-32 X 2 PHIL PAN SST	2	EA
ALS6P033	SCREW 4-40 X 3/16 FH PHIL SST	2	EA
ALS6P085	SCREW 4-40 X 1/4 FH PHIL SST	14	EA
AMS8P091	SCREW 4-40 X 1/4 PHIL PAN SST	12	EA
AMS8P036	WASHER #4 LOCK SST	12	EA
AMS7P068	SCREW JACK D-CONNECTOR KEYSTON	4	EA
AMS4P163	CONN DB9P CRIMP AMP USED WITH	1	EA
ALS9F040	PCB ASSY RIB CNTR TESTED	1	EA

8.1.1 Magnetic Pickup Cable for Depth – AM5KA024-XX (Length)

The wiring to the magnetic pickup input on the panel is via a 6 pin MIL-C chassis socket. This is mounted with terminal A uppermost. The wiring to the magnetic pickup is pin-for-pin straight through.

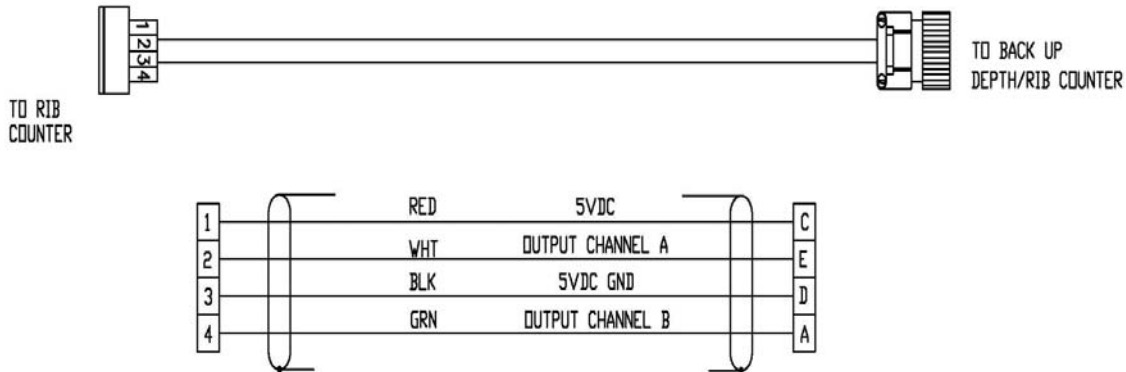


Function	Pin Number
Vsensor	A
Channel A	E
Channel B	C
Ground	D

Benchmark P/N	Description	Qty Required
AMS4P222	CABLE 20/4C ALPHA 25154 BLACK SHIELDED 0.28OD	XX FT
AM5KP057	CONN KPT06F10-6P STR PLUG MS3116 W/STRAIN RELIEF	1 EA
AM5KP058	CONN KPT08F10-6S RT ANGLE PLUG W/STRAIN RELIEF OR EQUIVALENT	1 EA
AM5KP059	DUST CAP KPT8010C CANNON SHELL SIZE 10 OR EQUIV	2 EA
AM5KA034	BUSHING #9779-513-4 AMPHENOL	2 EA

8.1.2 Rib Counter Cable – ALS9A208-XX (Length)

The wiring to the rib counter input is from 4 pin connector coming from the sensor to a 6 pin MIL-C connector on the panel with terminal A uppermost. The wiring to the rib counter is shown below.

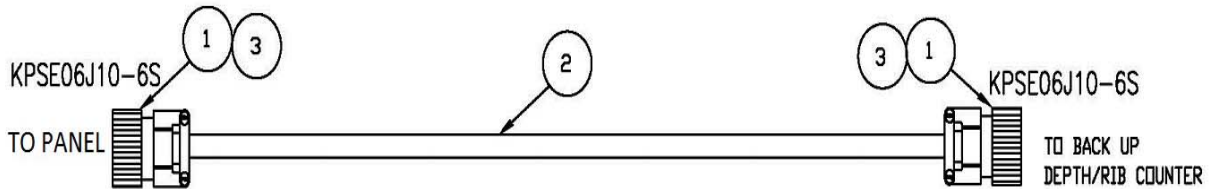


ALS9A208-XX CABLE ASSY DRUM COUNTER TO RIB SENSOR

Component	Description	Qty	Required	UM
AMS4P266	CONN KPSE06J10-6S STR PLUG	1		EA
AMS4P222	CABLE 20/4C ALPHA 25154 BLACK	XX		FT
ALS9P203	CONN 282192-1 4 PIN GEAR TOOTH	1		EA
ALS9P204	PIN CONNECTOR USE W/AMS9P203	4		EA
AMS4P209	TUBING SHRINK 0.75 ADH LINED	2		IN

8.1.3 Magnetic Pickup Cable for Drum Revolutions – ALS9A209-XX (Length)

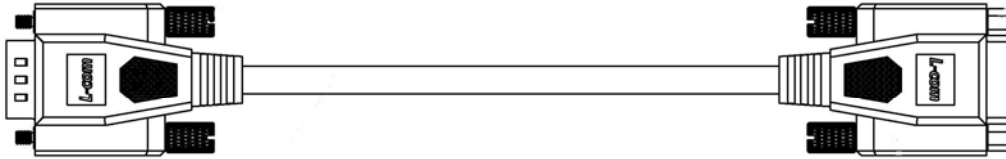
The wiring to the drum counter input installed on the slip ring is from 6 socket MIL-C connector coming from the sensor to a 6 pin MIL-C connector on the panel with terminal A uppermost. The wiring is shown below:



ALS9A209-XX

PART	DESCRIPTION	QTY	UM
	CABLE ASSY MAG SENSOR TO PANL		
AMS4P266	CONN KPSE06J10-6S STR PLUG	2	EA
AMS4P222	CABLE 20/4C ALPHA 25154 BLACK	XX	FT
AMS4P209	TUBING SHRINK 0.75 ADH LINED	2	IN

8.1.4 CAN BUS Cable - ALS9A206



WIRING MAP		
"P1"	COLOR	"J1"
1	BLACK	1
2	GRAY	2
3	RED	3
4	GREEN	4
5	BROWN	5
6	BLUE	6
7	ORANGE	7
8	YELLOW	8
9	PURPLE	9
SHELL	DRAIN WIRE	SHELL

ALS9A250 WIRE LIST

P1 - 12 CKT CONN PCB HARNESS BODY 102398-4 AMP AMS7P021						
FROM				TO		SIGNAL NAME
P1 - 1	HALL 2 PWR	BRN	22	J2 - C	DRUM CNTR POWER	
P1 - 2	HALL 2 GND	BLK	22	J2 - D	DRUM CNTR GND	
P1 - 3	BATT +	RED	22	BATT STRAP RED	BACK UP BATTERY 3.6V	
P1 - 4	GND	BLK	22	BATT STRAP BLK J1 - D	SPLICE TO BATRTN AND ENCODER RTN	
P1 - 5	A	ORN	22	J1 - E	ENCODER PHASE A	
P1 - 6	B	YEL	22	J1 - C	ENCODER PHASE B	
P1 - 7	HALL_SW_PWR	GRN	22	J1 - A	ENCODER POWER	
P1 - 10	ZERO STROBE	ORN	22	RS232-6		
P1 - 11	GND	PUR	22	PSAC_12_J2 RTN		
P1 - 12	GND	GRY	22	12-24VDC - B		
P1 - 13	+12_AC	WHT	22	PSAC_12_J2 VO		
P1 - 14	+12V_DC	BRN	22	12-24VDC - A		
P1 - 15	A2	GRN	22	J2 - E		
P1 - 16	B2	GRY	22	J2 - A		
HDR5-1	REEL2 PHASE A	RED	22	J2-B (DRUM)	REEL2 PHASE A	
HDR5-2	REEL2 PHASE B	BLU	22	J2-F (DRUM)	REEL2 PHASE B	
POWER SUPPLY AC TO 12V AMS4P621						
FROM				TO		SIGNAL NAME
J4 - ~N	AC NEUTRAL	WHT	22	AC CONN - N	AC POWER IN	
J4 - ~L	AC LINE	BLK	22	AC CONN - P	AC POWER IN	
CAN CONNECTOR BACK PANEL (DB9P)						

FROM				TO	SIGNAL NAME
CAN-2		BRN	22	HDR3-2	CAN-LO
CAN-7		BLU	22	HDR3-1	CAN-HI
CAN-3		BLK	22	HDR3-3	CAN_GND
RS232 CONNECTOR BACK PANEL (DB9S)					
FROM				TO	SIGNAL NAME
RS232-2	RS232RX	BRN	22	HDR6-1	BOARD TX
RS232-3	RS232TX	BLU	22	HDR6-2	BOARD RX
RS232-5		BLK	22	HDR6-3	GND